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UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED
PATENT

6263588

July 24, 2001

Vacuum processing apparatus and operating method therefor

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PRIORITY: August 29, 1990 - 2-225321, Japan (JP)

ENGLISH-ABST:

This invention relates to a vacuum processing apparatus having vacuum processing chambers the insides of which must be dry cleaned, and to a method of operating such an apparatus. When the vacuum processing chambers are dry-cleaned, dummy substrates are transferred into the vacuum processing chamber by substrates conveyor means from dummy substrate storage means which is disposed in the air atmosphere together with storage means for storing substrates to be processed, and the inside of the vacuum processing chamber is dry-cleaned by generating a plasma. The dummy substrate is returned to the dummy substrate storage means after dry cleaning is completed. Accordingly, any specific mechanism for only the cleaning purpose is not necessary and the construction of the apparatus can be made simple. Furthermore, the dummy substrates used to dry cleaning and the substrates to be processed do not coexist, contamination of the substrates to be processed due to dust and remaining gas can be prevented and the production yield can be high.

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**** SS 1: Results 1**

1 / 1 PLUSPAT - @QUESTEL-ORBIT
PN - US6263588 B1 20010724 [US6263588]
TI - (B1) Vacuum processing apparatus and operating method therefor
PA - (B1) HITACHI LTD (US)
PAO - Hitachi, Ltd., Tokyo [JP]
IN - (B1) TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP); KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP)
AP - US61477000 20000712 [2000US-0614770]
FD - Divsn of US552572 20000419 [2000US-0552572]
Divsn of US461432 19991216 [1999US-0461432] (Abandoned)
Cont. of US177495 19981023 [1998US-0177495]
Cont. of US061062 19980416 [1998US-0061062]
Cont. of US882731 19970626 [1997US-0882731]
Divsn of US593870 19960130 [1996US-0593870]
Cont. of US443039 19950517 [1995US-0443039]
Divsn of US302443 19940909 [1994US-0302443]
Cont. of US096256 19930726 [1993US-0096256]
Cont. of US751951 19910829 [1991US-0751951]
Continuation of: US6012235
Continuation of: US5950330
Continuation of: US5784799
Division of: US5661913
Continuation of: US5553396
Division of: US5457896
Continuation of: US5349762
Continuation of: US5314509
PR - US61477000 20000712 [2000US-0614770]
JP22532190 19900829 [1990JP-0225321]
US55257200 20000419 [2000US-0552572]
US46143299 19991216 [1999US-0461432]
US17749598 19981023 [1998US-0177495]
US6106298 19980416 [1998US-0061062]
US88273197 19970626 [1997US-0882731]
US59387096 19960130 [1996US-0593870]
US44303995 19950517 [1995US-0443039]
US30244394 19940909 [1994US-0302443]
US9625693 19930726 [1993US-0096256]
US75195191 19910829 [1991US-0751951]
IC - (B1) F26B-005/04
EC - C23C-014/56D
H01L-021/00S2D4
H01L-021/00S2Z
H01L-021/00S6
H01L-021/00S6B
H01L-021/00S8B
PCL - ORIGINAL (O) : 034417000; CROSS-REFERENCE (X) : 034229000
DT - Corresponding document
CT - US3652444; US3981791; US4138306; US4226897; US4311427; US4313783;
US4313815; US4318767; US4449885; US4457661; US4534314; US4563240;
US4576698; US4634331; US4643629; US4705951; US4715764; US4824309;
US4836733; US4836905; US4851101; US4895107; US4902934; US4903937;
US4909695; US4911597; US4915564; US4917556; US4923584; US4924890;
US4936329; US4951601; US4969790; US5007981; US5014217; US5292393;
US5351415; US5436848; US5452166; US5462397; US5504033; US5504347;
US5509771; US5556714; US5651858; US5675461; US5685684; US6007675;
EP20246453; EP20381338; JP57-29577; JP60-246635; JP62-44571;
JP62-50463; JP62-89881; JP62-207866; JP63-153270; JP6412037;
JP636582; JP131970; JP131971; JP1135015; JP1251734; JP1310553;
JP1298180; JP261064; JP265252; JP294647; JP2106037; JP430549;

WO8707309

R.P.H. Chang, "Multipurpose plasma reactor for materials research and processing", J. Vac. Sci. Technol., vol. 14, No. 1, Jan./Feb. 1977, pp. 278-280.

Semiconductor Equipment Association of Japan, "Terminological Dictionary of Semiconductor Equipment", front, table, p. 183, back, Nov. 20, 1987.

Semiconductor Equipment Association of Japan, "Semiconductor News", vol. 4, pp. 38-43, Apr. 10, 1987 (w/translation).

STG - (B1) U.S. Patent (no pre-grant pub.) after Jan. 2, 2001
AB - This invention relates to a vacuum processing apparatus having vacuum processing chambers the insides of which must be dry cleaned, and to a method of operating such an apparatus. When the vacuum processing chambers are dry-cleaned, dummy substrates are transferred into the vacuum processing chamber by substrate conveyor means from dummy substrate storage means which is disposed in the air atmosphere together with storage means for storing substrates to be processed, and the inside of the vacuum processing chamber is dry-cleaned by generating a plasma. The dummy substrate is returned to the dummy substrate storage means after dry cleaning is completed. Accordingly, any specific mechanism for only the cleaning purpose is not necessary and the construction of the apparatus can be made simple. Furthermore, the dummy substrates used to dry cleaning and the substrates to be processed do not coexist, contamination of the substrates to be processed due to dust and remaining gas can be prevented and the production yield can be high.
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1 / 1 LGST - @LEGSTAT
PN - US 6263588 [US6263588]
AP - US 614770/00 20000712 [2000US-0614770]
DT - US-P
ACT - 20000712 US/AE-A
APPLICATION DATA (PATENT)
US 614770/00 20000712 [2000US-0614770]

20010724 US/BA
PATENT (NO PREVIOUS PRE-GRANT PUBLICATION)

20020521 US/RF
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20020205
UP - 2002-22

1 / 1 CRXX - @CLAIMS/RRX
PN - 6,263,588 A 20010724 [US6263588]
PA - Hitachi Ltd JP
ACT - 20020205 REISSUE REQUESTED
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PN - 6263588 A [US6263588]
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ACT - REISSUE APPLICATION FILED

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Basic Patent (No,Kind,Date): EP 475604 A1 19920318 <No. of Patents: 080>

PATENT FAMILY:

GERMANY (DE)

Patent (No,Kind,Date): DE 69128861 C0 19980312
VAKUUMSBEHANDLUNGSVORRICHTUNG UND REINIGUNGSVERFAHREN DAFUER (German)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); TSUBONE TSUNEHICO (JP);
NISHIHATA KOUJI (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): JP 90225321 A 19900829
Applic (No,Kind,Date): DE 69128861 A 19910819
IPC: * H01L-021/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: German
Patent (No,Kind,Date): DE 69128861 T2 19981008
VAKUUMSBEHANDLUNGSVORRICHTUNG UND REINIGUNGSVERFAHREN DAFUER (German)
Patent Assignee: HITACHI LTD (JP)
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NISHIHATA KOUJI (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): JP 90225321 A 19900829
Applic (No,Kind,Date): DE 69128861 A 19910819
IPC: * H01L-021/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: German

EUROPEAN PATENT OFFICE (EP)

Patent (No,Kind,Date): EP 475604 A1 19920318
VACUUM PROCESSING APPARATUS AND CLEANING METHOD THEREFOR (English;
French; German)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); TSUBONE TSUNEHICO (JP);
NISHIHATA KOUJI (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): JP 90225321 A 19900829
Applic (No,Kind,Date): EP 91307625 A 19910819
Designated States: (National) DE; FR; GB
IPC: * H01L-021/00
Derwent WPI Acc No: ; G 92-090205
Language of Document: English
Patent (No,Kind,Date): EP 805481 A2 19971105
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English;
French; German)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): EP 91307625 A3 19910819; JP 90225321 A
19900829
Applic (No,Kind,Date): EP 97111628 A 19910819
Designated States: (National) DE; FR; GB
IPC: * H01L-021/00; C23C-014/56
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844; C 97-529274
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): EP 856875 A2 19980805

VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English;
French; German)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): EP 97111628 A3 19910819; JP 90225321 A
19900829
Applic (No,Kind,Date): EP 98106162 A 19910819
Designated States: (National) DE; FR; GB
IPC: * H01L-021/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844; G 98-401136
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): EP 1076354 A2 20010214
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English;
French; German)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); TSUBONE TSUNEHICO (JP);
NISHIHATA KOUJI (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): EP 97111628 A3 19910819; EP 91307625 A3
19910819; JP 90225321 A 19900829
Applic (No,Kind,Date): EP 2000121402 A 19910819
Designated States: (National) DE; FR; GB
IPC: * H01L-021/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): EP 1079418 A2 20010228
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English;
French; German)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); TSUBONE TSUNEHICO (JP);
NISHIHATA KOUJI (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): EP 97111628 A3 19910819; EP 91307625 A3
19910819; JP 90225321 A 19900829
Applic (No,Kind,Date): EP 2000121401 A 19910819
Designated States: (National) DE; FR; GB
IPC: * H01L-021/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844; G 02-107535
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): EP 805481 A3 19980520
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English;
French; German)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): EP 91307625 A3 19910819; JP 90225321 A
19900829
Applic (No,Kind,Date): EP 97111628 A 19910819
Designated States: (National) DE; FR; GB
IPC: * H01L-021/00; C23C-014/56
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): EP 856875 A3 19990428
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English;
French; German)

Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): EP 97111628 A3 19910819; JP 90225321 A
19900829
Applic (No,Kind,Date): EP 98106162 A 19910819
Designated States: (National) DE; FR; GB
IPC: * H01L-021/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): EP 1076354 A3 20020807
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English;
French; German)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); TSUBONE TSUNEHICO (JP);
NISHIHATA KOUJI (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): EP 97111628 A3 19910819; EP 91307625 A3
19910819; JP 90225321 A 19900829
Applic (No,Kind,Date): EP 2000121402 A 19910819
Designated States: (National) DE; FR; GB
IPC: * H01L-021/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): EP 1079418 A3 20020807
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English;
French; German)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); TSUBONE TSUNEHICO (JP);
NISHIHATA KOUJI (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): EP 97111628 A3 19910819; EP 91307625 A3
19910819; JP 90225321 A 19900829
Applic (No,Kind,Date): EP 2000121401 A 19910819
Designated States: (National) DE; FR; GB
IPC: * H01L-021/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): EP 475604 B1 19980204
VACUUM PROCESSING APPARATUS AND CLEANING METHOD THEREFOR (English;
French; German)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); TSUBONE TSUNEHICO (JP);
NISHIHATA KOUJI (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): JP 90225321 A 19900829
Applic (No,Kind,Date): EP 91307625 A 19910819
Designated States: (National) DE; FR; GB
IPC: * H01L-021/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English

JAPAN (JP)

Patent (No,Kind,Date): JP 4108531 A2 19920409
VACUUM TREATMENT APPARATUS (English)
Patent Assignee: HITACHI LTD
Author (Inventor): KATO SHIGEKAZU; NISHIHATA KOJI; TSUBONE TSUNEHICO;

ITO ATSUSHI

Priority (No,Kind,Date): JP 90225321 A 19900829

Applic (No,Kind,Date): JP 90225321 A 19900829

IPC: * B01J-003/00

JAPIO Reference No: ; 160351C000155

Language of Document: Japanese

Patent (No,Kind,Date): JP 4110169 A2 19920410

IMAGE RECORDER (English)

Patent Assignee: CANON KK

Author (Inventor): SUZUKI AKIO

Priority (No,Kind,Date): JP 90228396 A 19900831

Applic (No,Kind,Date): JP 90228396 A 19900831

IPC: * B41J-002/365; B41J-002/36

JAPIO Reference No: ; 160353M000093

Language of Document: Japanese

Patent (No,Kind,Date): JP 2644912 B2 19970825

SHINKUSHORISOCHIOYOBISONONTENHOHO (English)

Priority (No,Kind,Date): JP 90225321 A 19900829

Applic (No,Kind,Date): JP 90225321 A 19900829

IPC: * B01J-003/00

Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844

JAPIO Reference No: * 160351C000155

Language of Document: Japanese

Patent (No,Kind,Date): JP 2950950 B2 19990920

Priority (No,Kind,Date): JP 90228396 A 19900831

Applic (No,Kind,Date): JP 90228396 A 19900831

IPC: * B41J-002/01; B41J-002/36

Derwent WPI Acc No: * G 94-279094

JAPIO Reference No: * 160353M000093

Language of Document: Japanese

KOREA, REPUBLIC (KR)

Patent (No,Kind,Date): KR 184682 B1 19990415

VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)

Patent Assignee: HITACHI LTD (JP)

Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);

TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)

Priority (No,Kind,Date): JP 90225321 A 19900829

Applic (No,Kind,Date): KR 9114984 A 19910829

IPC: * H01L-021/304

Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844

JAPIO Reference No: * 160351C000155

Language of Document: Korean

Patent (No,Kind,Date): KR 212819 B1 19990901

TRANSFERRING SYSTEM AND VACUUM TREATING APPARATUS AND METHOD THEREBY
(English)

Patent Assignee: HITACHI LTD (JP)

Author (Inventor): NISHIHATA GOJI (JP); TSUBONE TSUNEHICO (JP); ITO
ATSUSHI (JP)

Priority (No,Kind,Date): JP 90225321 A 19900829; KR 9114984 A3
19910829

Applic (No,Kind,Date): KR 9846757 A 19981102

IPC: * H01L-021/304

Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844

JAPIO Reference No: * 160351C000155

Language of Document: Korean

Patent (No,Kind,Date): KR 212874 B1 19990901

TRANSFERRING SYSTEM AND VACUUM TREATING APPARATUS THEREBY (English)

Patent Assignee: HITACHI LTD (JP)

Author (Inventor): GATO SIGEGATSU (JP); NISHIHATA GOJI (JP); TSUBONE
TSUNEHICO (JP); ITO ATSUSI (JP)
Priority (No,Kind,Date): JP 90225321 A 19900829; KR 9114984 A3
19910829
Applic (No,Kind,Date): KR 9846756 A 19981102
IPC: * H01L-021/304
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: Korean

UNITED STATES OF AMERICA (US)

Patent (No,Kind,Date): US 5314509 A 19940524
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): JP 90225321 A 19900829
Applic (No,Kind,Date): US 751951 A 19910829
National Class: * 034406000; 034092000; 134902000; 414225000
IPC: * B08B-003/00; C23C-016/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English

Patent (No,Kind,Date): US 5343231 A 19940830
IMAGE RECORDING APPARATUS CAPABLE OF CORRECTING DENSITY UNEVENNESS
(English)
Patent Assignee: CANON KK (JP)
Author (Inventor): SUZUKI AKIO (JP)
Priority (No,Kind,Date): US 3992 A 19930115; JP 90228396 A
19900831; US 751952 B1 19910829
Applic (No,Kind,Date): US 3992 A 19930115
National Class: * 347014000; 347015000
IPC: * B41J-002/05
Derwent WPI Acc No: * G 94-279094; G 94-279094
JAPIO Reference No: * 160353M000093
Language of Document: English

Patent (No,Kind,Date): US 5349762 A 19940927
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 96256 A 19930726; JP 90225321 A
19900829; US 751951 A1 19910829
Applic (No,Kind,Date): US 96256 A 19930726
National Class: * 034406000; 034092000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English

Patent (No,Kind,Date): US 5457896 A 19951017
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 302443 A 19940909; JP 90225321 A
19900829; US 96256 A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 302443 A 19940909
Addnl Info: 5349762 Patented; 5314509 Patented
National Class: * 034406000; 034092000

IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 5553396 A 19960910
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 443039 A 19950517; JP 90225321 A
19900829; US 302443 A3 19940909; US 96256 A1 19930726; US 751951
A1 19910829
Applic (No,Kind,Date): US 443039 A 19950517
Addnl Info: 5457896 Patented; 5349762 Patented; 5314509 Patented
National Class: * 034406000; 034092000; 414225000; 134902000
IPC: * B08B-003/00; C23C-016/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 5661913 A 19970902
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 593870 A 19960130; JP 90225321 A
19900829; US 443039 A1 19950517; US 302443 A3 19940909; US 96256
A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 593870 A 19960130
Addnl Info: 5553396 Patented; 5457896 Patented; 5349762 Patented;
5314509 Patented
National Class: * 034406000; 134902000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 5784799 A 19980728
VACUUM PROCESSING APPARATUS FOR SUBSTATE WAFERS (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 882731 A 19970626; JP 90225321 A
19900829; US 593870 A3 19960130; US 443039 A1 19950517; US 302443
A3 19940909; US 96256 A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 882731 A 19970626
Addnl Info: 5661913 Patented; 5553396 Patented; 5457896 Patented;
5349762 Patented; 5314509 Patented
National Class: * 034092000; 414217000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 5950330 A 19990914
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 61062 A 19980416; JP 90225321 A
19900829; US 882731 A1 19970626; US 593870 A3 19960130; US 443039

A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 61062 A 19980416
Addnl Info: 5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762 Patented; 5314509 Patented
National Class: * 034406000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6012235 A 20000111
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 177495 A 19981023; JP 90225321 A 19900829; US 61062 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 177495 A 19981023
Addnl Info: 5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762 Patented; 5314509 Patented
National Class: * 034406000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6044576 A 20000404
VACUUM PROCESSING AND OPERATING METHOD USING A VACUUM CHAMBER (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 390684 A 19990907; JP 90225321 A 19900829; US 177495 A3 19981023; US 61062 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 390684 A 19990907
Addnl Info: 5950330 Patented; 5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762 Patented; 5314509 Patented
National Class: * 034406000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6055740 A 20000502
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 231451 A 19990115; JP 90225321 A 19900829; US 61062 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 231451 A 19990115
Addnl Info: 5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762 Patented; 5314509 Patented
National Class: * 034092000; 034228000
IPC: * F26B-013/30

Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6070341 A 20000606
VACUUM PROCESSING AND OPERATING METHOD WITH WAFERS, SUBSTRATES AND/OR
SEMICONDUCTORS (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 390681 A 19990907; JP 90225321 A
19900829; US 177495 A3 19981023; US 61062 A1 19980416; US 882731
A1 19970626; US 593870 A3 19960130; US 443039 A1 19950517; US
302443 A3 19940909; US 96256 A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 390681 A 19990907
Addnl Info: 5950330 Patented; 5784799 Patented; 5661913 Patented;
5553396 Patented; 5457896 Patented; 5349762 Patented; 5314509
Patented
National Class: * 034406000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6108929 A 20000829
VACUUM PROCESSING APPARATUS (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 461433 A 19991216; JP 90225321 A
19900829; US 231451 A1 19990115; US 61062 A1 19980416; US 882731
A1 19970626; US 593870 A3 19960130; US 443039 A1 19950517; US
302443 A3 19940909; US 96256 A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 461433 A 19991216
Addnl Info: 5950330 Patented; 5784799 Patented; 5661913 Patented;
5553396 Patented; 5457896 Patented; 5349762 Patented; 5314509
Patented
National Class: * 034092000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6112431 A 20000905
VACUUM PROCESSING AND OPERATING METHOD (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 389461 A 19990903; JP 90225321 A
19900829; US 177495 A3 19981023; US 61062 A1 19980416; US 882731
A1 19970626; US 593870 A3 19960130; US 443039 A1 19950517; US
302443 A3 19940909; US 96256 A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 389461 A 19990903
Addnl Info: 5950330 Patented; 5784799 Patented; 5661913 Patented;
5553396 Patented; 5457896 Patented; 5349762 Patented; 5314509
Patented
National Class: * 034406000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English

Patent (No,Kind,Date): US 20010000048 AA 20010322
 VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
 Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
 TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
 TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 725257 A 20001129; JP 90225321 A
 19900829; US 552572 A1 20000419; US 461432 B3 19991216; US 177495
 A1 19981023; US 61062 A1 19980416; US 882731 A1 19970626; US
 593870 A3 19960130; US 443039 A1 19950517; US 302443 A3
 19940909; US 96256 A1 19930726; US 751951 A1 19910829
 Applic (No,Kind,Date): US 725257 A 20001129
 Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
 Patented; 5314509 Patented
 National Class: * 034092000
 IPC: * F26B-013/30
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155
 Language of Document: English
 Patent (No,Kind,Date): US 20010001901 AA 20010531
 VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
 Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
 TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
 TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 766976 A 20010123; JP 90225321 A
 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
 ; US 751952 B1 19910829
 Applic (No,Kind,Date): US 766976 A 20010123
 Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
 Patented
 National Class: * 034406000
 IPC: * F26B-005/04
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
 98-401136; G 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155
 Language of Document: English
 Patent (No,Kind,Date): US 20010001902 AA 20010531
 VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
 Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
 TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
 TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 767837 A 20010124; JP 90225321 A
 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
 ; US 751952 B1 19910829; US 766587 A3 20010123
 Applic (No,Kind,Date): US 767837 A 20010124
 Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
 Patented
 National Class: * 034406000
 IPC: * F26B-005/04
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
 98-401136; G 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155

Language of Document: English
 Patent (No,Kind,Date): US 20010002517 AA 20010607
 VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
 Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
 TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
 TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 766975 A 20010123; JP 90225321 A
 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
 ; US 751952 B1 19910829
 Applic (No,Kind,Date): US 766975 A 20010123
 Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
 Patented
 National Class: * 034406000
 IPC: * F26B-005/04
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
 98-401136; G 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155
 Language of Document: English
 Patent (No,Kind,Date): US 20010003873 AA 20010621
 VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
 Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
 TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
 TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 781296 A 20010213; JP 90225321 A
 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
 ; US 751951 A1 19910829; US 766587 A 20010123
 Applic (No,Kind,Date): US 781296 A 20010213
 Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
 Patented; 5314509 Patented
 National Class: * 034406000
 IPC: * F26B-005/04
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155
 Language of Document: English
 Patent (No,Kind,Date): US 20010004554 AA 20010621
 VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
 Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
 TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
 TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 766587 A 20010123; JP 90225321 A
 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
 ; US 751952 B1 19910829
 Applic (No,Kind,Date): US 766587 A 20010123
 Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
 Patented
 National Class: * 438758000; 438907000
 IPC: * H01L-021/31
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
 98-401136; G 02-107535; G 02-123844

JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 20010004807 AA 20010628
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
TSUNEHICO (JP); ITOU ATSUSHI (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 780444 A 20010212; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 780444 A 20010212
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented
National Class: * 034406000; 034092000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 20010007175 AA 20010712
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
TSUNEHICO (JP); ITOU ATSUSHI (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 781298 A 20010213; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 781298 A 20010213
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented
National Class: * 034417000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 20010008050 AA 20010719
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
TSUNEHICO (JP); ITOU ATSUSHI (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 781293 A 20010213; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 781293 A 20010213
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented
National Class: * 034406000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G

98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 20010008051 AA 20010719
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
TSUNEHICO (JP); ITOU ATSUSHI (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 781295 A 20010213; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 781295 A 20010213
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented
National Class: * 034406000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 20010008052 AA 20010719
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
TSUNEHICO (JP); ITOU ATSUSHI (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 781297 A 20010213; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751951 A1 19910829; US 766587 A3 20010123
Applic (No,Kind,Date): US 781297 A 20010213
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented; 5314509 Patented
National Class: * 034406000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 20010009073 AA 20010726
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
TSUNEHICO (JP); ITOU ATSUSHI (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 766597 A 20010123; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751951 A1 19910829
Applic (No,Kind,Date): US 766597 A 20010123
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented; 5314509 Patented
National Class: * 034406000
IPC: * F26B-013/30; F26B-005/04

Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155
 Language of Document: English
 Patent (No,Kind,Date): US 20010009074 AA 20010726
 VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
 Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
 TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
 TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 781270 A 20010213; JP 90225321 A
 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
 ; US 751952 B1 19910829
 Applic (No,Kind,Date): US 781270 A 20010213
 Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
 Patented
 National Class: * 034406000
 IPC: * F26B-013/30; F26B-005/04
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
 98-401136; G 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155
 Language of Document: English
 Patent (No,Kind,Date): US 20010009075 AA 20010726
 VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
 Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
 TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
 TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 781452 A 20010213; JP 90225321 A
 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
 ; US 751952 B1 19910829
 Applic (No,Kind,Date): US 781452 A 20010213
 Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
 Patented
 National Class: * 034406000
 IPC: * F26B-013/30; F26B-005/04
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
 98-401136; G 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155
 Language of Document: English
 Patent (No,Kind,Date): US 20010009076 AA 20010726
 SUBSTRATE CHANGING-OVER MECHANISM IN A VACCUM TANK, COMPRISING
 (English)
 Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
 TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
 TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 782194 A 20010214; JP 90225321 A
 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
 ; US 751951 A1 19910829
 Applic (No,Kind,Date): US 782194 A 20010214
 Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
 Patented; 5314509 Patented

National Class: * 034406000
 IPC: * F26B-013/30; F26B-005/04
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155
 Language of Document: English
 Patent (No,Kind,Date): US 20010010126 AA 20010802
 VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
 Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 782193 A 20010214; JP 90225321 A 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726; US 751952 B1 19910829
 Applic (No,Kind,Date): US 782193 A 20010214
 Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762 Patented
 National Class: * 034406000
 IPC: * F26B-005/04
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G 98-401136; G 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155
 Language of Document: English
 Patent (No,Kind,Date): US 20010011422 AA 20010809
 VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
 Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 781317 A 20010213; JP 90225321 A 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726; US 751951 A1 19910829
 Applic (No,Kind,Date): US 781317 A 20010213
 Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762 Patented; 5314509 Patented
 National Class: * 034092000
 IPC: * F26B-013/30
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155
 Language of Document: English
 Patent (No,Kind,Date): US 20010011423 AA 20010809
 VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
 Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 782197 A 20010214; JP 90225321 A 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726; US 751952 B1 19910829
 Applic (No,Kind,Date): US 782197 A 20010214
 Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762

Patented
National Class: * 034092000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 20010016990 AA 20010830
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
TSUNEHICO (JP); ITOU ATSUSHI (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 782192 A 20010214; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751951 A1 19910829; US 766587 A3 20010123
Applic (No,Kind,Date): US 782192 A 20010214
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented; 5314509 Patented
National Class: * 034406000
IPC: * F26B-013/30; F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 20010020339 AA 20010913
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
TSUNEHICO (JP); ITOU ATSUSHI (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 780394 A 20010212; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 780394 A 20010212
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented
National Class: * 034406000
IPC: * F26B-013/30; F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 20010020340 AA 20010913
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
TSUNEHICO (JP); ITOU ATSUSHI (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 782196 A 20010214; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751951 A1 19910829; US 766587 A3 20010123
Applic (No,Kind,Date): US 782196 A 20010214
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;

5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented; 5314509 Patented
National Class: * 034406000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 20010037585 AA 20011108
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
TSUNEHICO (JP); ITOU ATSUSHI (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 767834 A 20010124; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 767834 A 20010124
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented
National Class: * 034406000; 034092000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 20020032972 AA 20020321
SUBSTRATE CHANGING-OVER MECHANISM IN VACUUM TANK (English)
Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
TSUNEHICO (JP); ITOU ATSUSHI (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 782195 A 20010214; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829; US 766587 A3 20010123
Applic (No,Kind,Date): US 782195 A 20010214
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented
National Class: * 034406000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6263588 BA 20010724
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (US)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 614770 A 20000712; JP 90225321 A
19900829; US 552572 A3 20000419; US 461432 B3 19991216; US 177495
A1 19981023; US 61062 A1 19980416; US 882731 A1 19970626; US
593870 A3 19960130; US 443039 A1 19950517; US 302443 A3
19940909; US 96256 A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 614770 A 20000712
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;

5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented; 5314509 Patented
National Class: * 034417000; 034229000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6301801 BA 20011016
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP); TSUBONE
TSUNEHICO (JP); ITOU ATSUSHI (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 552572 A 20000419; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751951 A1 19910829
Applic (No,Kind,Date): US 552572 A 20000419
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented; 5314509 Patented
National Class: * 034406000; 034092000; 034228000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6301802 BA 20011016
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (US)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 765379 A 20010122; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 765379 A 20010122
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented
National Class: * 034406000; 034417000; 034092000; 034229000;
118729000; 414744100; 414744600; 414939000; 414940000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6330755 BA 20011218
VACUUM PROCESSING APPARATUS AND OPERATING METHOD (English)
Patent Assignee: HITACHI LTD (US)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 461432 A 19991216; JP 90225321 A
19900829; US 177495 A1 19981023; US 61062 A1 19980416; US 882731
A1 19970626; US 593870 A3 19960130; US 443039 A1 19950517; US
302443 A3 19940909; US 96256 A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 461432 A 19991216
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762

Patented; 5314509 Patented
National Class: * 034406000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6330756 BA 20011218
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (US)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 614764 A 20000712; JP 90225321 A
19900829; US 552572 A3 20000419; US 461432 B3 19991216; US 177495
A1 19981023; US 61062 A1 19980416; US 882731 A1 19970626; US
593870 A3 19960130; US 443039 A1 19950517; US 302443 A3
19940909; US 96256 A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 614764 A 20000712
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented; 5314509 Patented
National Class: * 034406000; 034417000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6446353 BA 20020910
VACUUM PROCESSING APPARATUS (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 781270 A 20010213; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 781270 A 20010213
Addnl Info: 6330755 Patented; 6012235 Patented; 5950330 Patented;
5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896
Patented; 5349762 Patented
National Class: * 034092000; 034060000; 034236000; 414217000;
414222130; 414939000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6463676 BA 20021015
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 780427 A 20010212; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 780427 A 20010212
Addnl Info: 6330755 Patented; 6012235 Patented; 5950330 Patented;
5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896
Patented; 5349762 Patented

National Class: * 034412000; 034092000; 034218000; 134902000;
414217000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6314658 BB 20011113
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (US)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 725257 A 20001129; JP 90225321 A
19900829; US 552572 A1 20000419; US 461432 B3 19991216; US 177495
A1 19981023; US 61062 A1 19980416; US 882731 A1 19970626; US
593870 A3 19960130; US 443039 A1 19950517; US 302443 A3
19940909; US 96256 A1 19930726; US 751951 A1 19910829
Applic (No,Kind,Date): US 725257 A 20001129
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented; 5314509 Patented
National Class: * 034406000; 034092000; 414225000; 134902000
IPC: * F26B-005/04; B08B-003/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6332280 BB 20011225
VACUUM PROCESSING APPARATUS (English)
Patent Assignee: HITACHI LTD (US)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 767834 A 20010124; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 767834 A 20010124
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented; 5314509 Patented
National Class: * 034217000; 034092000; 034222000; 034225000;
034236000; 414939000; 414940000; 134902000; 156345000
IPC: * F26B-019/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6339887 BB 20020122
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 767837 A 20010124; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829; US 766587 A3 20010123
Applic (No,Kind,Date): US 767837 A 20010124
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented

National Class: * 034406000; 034417000; 034092000; 034229000;
118729000; 414744600; 414939000; 414940000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6457253 BB 20021001
VACUUM PROCESSING APPARATUS (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 781317 A 20010213; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751951 A1 19910829
Applic (No,Kind,Date): US 781317 A 20010213
Addnl Info: 6330755 Patented; 6012235 Patented; 5950330 Patented;
5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896
Patented; 5349762 Patented; 5314509 Patented
National Class: * 034092000; 414217000; 134902000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6460270 BB 20021008
VACUUM PROCESSING APPARATUS (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 780394 A 20010212; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 780394 A 20010212
Addnl Info: 6330755 20000801 Patented; 6012235 Patented; 5950330
Patented; 5784799 Patented; 5661913 Patented; 5553396 Patented;
5457896 Patented; 5349762 Patented
National Class: * 034092000; 134902000; 414217000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6463678 BB 20021015
SUBSTRATE CHANGING-OVER MECHANISM IN A VACCUM TANK (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 782194 A 20010214; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751951 A1 19910829
Applic (No,Kind,Date): US 782194 A 20010214
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661973 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented; 5314509 Patented
National Class: * 034573000; 034526000; 034527000; 034573000;

034209000; 034217000; 414217000; 414940000
IPC: * F26B-013/10
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6467186 BB 20021022
TRANSFERRING DEVICE FOR A VACUUM PROCESSING APPARATUS AND OPERATING
METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 766976 A 20010123; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 766976 A 20010123
Addnl Info: 6330755 Patented; 6012235 Patented; 5950330 Patented;
5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896
Patented; 5349762 Patented
National Class: * 034092000; 043060000; 043236000; 414217000;
414222130; 414939000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6467187 BB 20021022
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 782192 A 20010214; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751951 A1 19910829; US 766587 A3 20010123
Applic (No,Kind,Date): US 782192 A 20010214
Addnl Info: 6330755 Patented; 6012235 Patented; 5950330 Patented;
5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896
Patented; 5349762 Patented
National Class: * 034092000; 034060000; 134085000; 134902000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6470596 BB 20021029
VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 767837 A 20010124; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829; US 766587 A3 20010123
Applic (No,Kind,Date): US 767837 A 20010124
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented

National Class: * 034406000; 034417000; 034092000; 034229000;
118729000; 414744600; 414939000; 414940000
IPC: * F26B-005/04
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6473989 BB 20021105
CONVEYING SYSTEM FOR A VACUUM PROCESSING APPARATUS (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 781297 A 20010213; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751951 A1 19910829; US 766587 A3 20010123
Applic (No,Kind,Date): US 781297 A 20010213
Addnl Info: 6330755 Patented; 6012235 Patented; 5950330 Patented;
5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896
Patented; 5349762 Patented
National Class: * 034092000; 034060000; 034236000; 414217000;
414222130; 414939000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6484414 BB 20021126
VACUUM PROCESSING APPARATUS (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 781298 A 20010213; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 781298 A 20010213
Addnl Info: 6330755 Patented; 6012235 Patented; 5950330 Patented;
5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896
Patented; 5349762 Patented
National Class: * 034092000; 034060000; 034236000; 414217000;
414222130; 414939000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6484415 BB 20021126
VACUUM PROCESSING APPARATUS (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 782193 A 20010214; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 782193 A 20010214
Addnl Info: 6330755 Patented; 6012235 Patented; 5950330 Patented;
5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896

Patented; 5349762 Patented
 National Class: * 034092000; 034060000; 034236000; 414222130;
 414217000
 IPC: * F26B-013/30
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
 98-401136; G 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155
 Language of Document: English
 Patent (No,Kind,Date): US 6487791 BB 20021203
 VACUUM PROCESSING APPARATUS (English)
 Patent Assignee: HITACHI LTD (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
 TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 782196 A 20010214; JP 90225321 A
 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
 ; US 751951 A1 19910829; US 766587 A3 20010123
 Applic (No,Kind,Date): US 782196 A 20010214
 Addnl Info: 6330755 Patented; 6012235 Patented; 5950330 Patented;
 5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896
 Patented; 5349762 Patented
 National Class: * 034217000; 034092000; 034222000; 034225000;
 034236000; 134902000; 414939000; 414940000; 156345000
 IPC: * F26B-019/00
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 98-401136; G
 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155
 Language of Document: English
 Patent (No,Kind,Date): US 6487793 BB 20021203
 VACUUM PROCESSING APPARATUS AND OPERATING METHOD THEREFOR (English)
 Patent Assignee: HITACHI LTD (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
 TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 766587 A 20010123; JP 90225321 A
 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
 ; US 751952 B1 19910829
 Applic (No,Kind,Date): US 766587 A 20010123
 Addnl Info: 6330755 Patented; 6012235 Patented; 5950330 Patented;
 5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896
 Patented; 5349762 Patented
 National Class: * 034412000; 034406000; 034418000; 034500000;
 034092000; 034218000; 134902000; 414939000; 414222130
 IPC: * F26B-005/04
 Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
 98-401136; G 02-107535; G 02-123844
 JAPIO Reference No: * 160351C000155
 Language of Document: English
 Patent (No,Kind,Date): US 6487794 BB 20021203
 SUBSTRATE CHANGING-OVER MECHANISM IN VACUUM TANK (English)
 Patent Assignee: HITACHI LTD (JP)
 Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
 TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
 Priority (No,Kind,Date): US 782195 A 20010214; JP 90225321 A
 19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
 A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
 443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
 ; US 751952 B1 19910829; US 766587 A3 20010123
 Applic (No,Kind,Date): US 782195 A 20010214
 Addnl Info: 6330755 Patented; 6012235 Patented; 5950330 Patented;

5784799 Patented; 5661913 Patented; 5553396 Patented; 5457896
Patented; 5349762 Patented
National Class: * 034573000; 034526000; 034527000; 034209000;
034217000; 414217000; 414939000; 414940000
IPC: * F26B-013/10
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6490810 BB 20021210
VACUUM PROCESSING APPARATUS (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 782197 A 20010214; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 782197 A 20010214
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented
National Class: * 034092000; 414225000; 134902000
IPC: * F26B-013/30
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English
Patent (No,Kind,Date): US 6499229 BB 20021231
VACUUM PROCESSING APPARATUS (English)
Patent Assignee: HITACHI LTD (JP)
Author (Inventor): KATO SHIGEKAZU (JP); NISHIHATA KOUJI (JP);
TSUBONE TSUNEHICO (JP); ITOU ATSUSHI (JP)
Priority (No,Kind,Date): US 781293 A 20010213; JP 90225321 A
19900829; US 461432 A3 19991216; US 177495 A1 19981023; US 61062
A1 19980416; US 882731 A1 19970626; US 593870 A3 19960130; US
443039 A1 19950517; US 302443 A3 19940909; US 96256 A1 19930726
; US 751952 B1 19910829
Applic (No,Kind,Date): US 781293 A 20010213
Addnl Info: 6012235 Patented; 5950330 Patented; 5784799 Patented;
5661913 Patented; 5553396 Patented; 5457896 Patented; 5349762
Patented
National Class: * 034217000; 034092000; 034222000; 034225000;
034236000; 414939000; 414940000; 134902000; 156345000
IPC: * F26B-019/00
Derwent WPI Acc No: * C 97-529274; G 92-090205; G 94-279094; G
98-401136; G 02-107535; G 02-123844
JAPIO Reference No: * 160351C000155
Language of Document: English